

**ABSTRACT**

The present invention relates to an apparatus and a process for electrolytically treating a metal surface. The apparatus includes an electrochemical cell which includes an anodic chamber, a cathodic chamber, and a divider separating the anodic chamber from the cathodic chamber. The anodic chamber has an anode and contains a conductive anodic medium. The cathodic chamber has, as a cathode, the metal surface to be treated, and contains a conductive cathodic medium including a silica compound. In one embodiment, during operation of the apparatus, the anode remains substantially free of accumulation of foreign materials. In another embodiment, during operation of the apparatus, organic or inorganic compounds in the conductive cathodic medium remain substantially free of oxidation by the anode. In one embodiment, the treating comprises deposition of a silicon-containing mineral on the metal surface.